AL-TR-1993-0005

ARMSTRONG LABORATORY

SOURCE EMISSION TESTING OF THE CLASSIFIED WASTE INCINERATOR, GRIFFISS AIR FORCE BASE, NEW YORK

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OCCUPATIONAL AND ENVIRONMENTAL
HEALTH DIRECTORATE
2402 E Drive
Brooks Air Force Base, TX 78235-5114

February 1993

Final Technical Report for Period 10-14 August 1992

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BROOKS AIR FORCE BASE, TEXAS

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13. ABSTRACT *(Maximum 200 words)*

Source emission testing for particulate matter and hydrogen chloride was conducted on the classified waste incinerator located in Bldg 13, Griffiss AFB NY. Compliance standards are found in Codes, Rules, and Regulations of the State of New York, Title 6. Test results indicate incinerator emissions are above the state standard for particulate matter. No hydrogen chloride standards are applicable to this incinerator. Recommendations are made to reduce particulate emissions and to retest.

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SOURCE EMISSION TESTING OF THE CLASSIFIED WASTE INCINERATOR, GRIFFISS AIR FORCE BASE, NEW YORK

INTRODUCTION

Background

A stationary source sampling survey for opacity, particulate emissions, and hydrogen chloride (HCl) emissions was conducted on the classified waste incinerator at Griffiss Air Force Base (AFB) NY on 10-14 Aug 92. Testing was attempted on 24-28 Feb 92, but inclement weather at Griffiss AFB prevented test completion. Successful source testing previously had been conducted on 19-23 Sep 88. The incinerator did not meet particulate emission limits at that time. Recommendations in the Sep 88 survey report (USAFOEHL REPORT 89-031EQ0079DEF) (1) were: (1) reduce the exit gas velocity to prevent particulate entrainment into the exhaust gas, and (2) reduce the loading charge rate. Recommendations were complied with prior to the Aug 92 retest. The current survey was requested (Appendix A) by the 416th Medical Group (416 MG/SGPB) to meet New York State Department of Environmental Conservation (NYSDEC) permit requirements. Personnel involved with on-site testing are listed in Appendix B.

Description

The classified incinerator (Figure 1) is located in Bldg 13, approximately 150 feet east of Bldg 19. The incinerator is an Advanced Combustion Model CA-750 Standard Unit (Figure 2). The incinerator is a two-chamber design. The primary chamber has one afterburner that is adjustable to 800,000 British thermal units per hour (Btu/hr). The secondary chamber has two afterburners that are adjustable to 1,200,000 Btu/hr. The primary chamber is under-grate, forced-air fed by one blower. The incinerator is fired by No. 2 diesel fuel. No pollution control equipment is installed. Equipment specifications are listed in Appendix C. The incinerator currently is used to burn Type 0 waste with a rated capacity of 500 pounds per hour (lb/hr).

Applicable Standards

Regulations applicable to this incinerator are contained in "Codes, Rules, and Regulations of the State of New York, Title 6, Chapter III - Resources, Subchapter A - Prevention and Control of Air Contamination and Air Pollution, Part 219" (6 NYCRR 219), as amended 28 May 92 (2). Regulations for existing incinerators are found in Subpart 219-5 (Appendix D). A copy of the application for the Certificate to Operate is provided in Appendix E.

Emission limits for this incinerator are 0.85 lb/hr for a 300 lb/hr charge (Subpart 219-5.2). Visible emissions must average less than 20 percent opacity for any 6 consecutive minutes (Subpart 219-5.3). There are no applicable hydrogen chloride standards.

METHODS AND MATERIALS

Sampling and analyses of the incinerator emissions were conducted in accordance with U.S. Environmental Protection Agency (EPA) Methods 1 through 5 and 26. These methods are found in Appendix A to Title 40, Code of Federal Regulations, Part 60 (3).

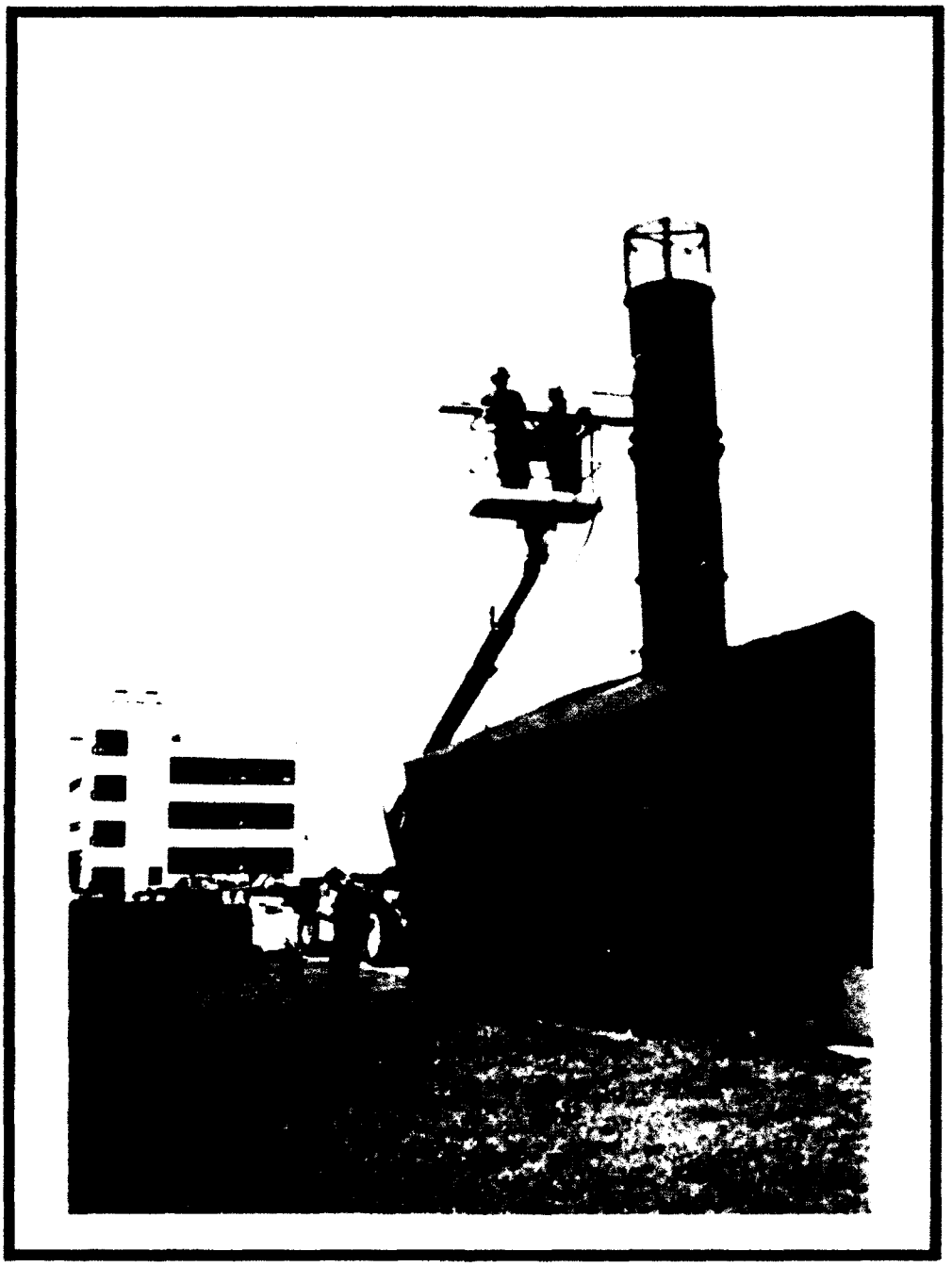


Figure 1. Classified Waste Incinerator Building and Stack.

The incinerator has a circular stack that is 3 feet in diameter. Total stack height is approximately 29 feet. The stack has two port holes that are located on the same horizontal plane, 90 degrees apart. The ports are located 13.5 feet (4.5 duct diameters) downstream and 4.5 feet (1.5 duct diameters) upstream from any flow disturbance. Twenty-four traverse points (twelve per

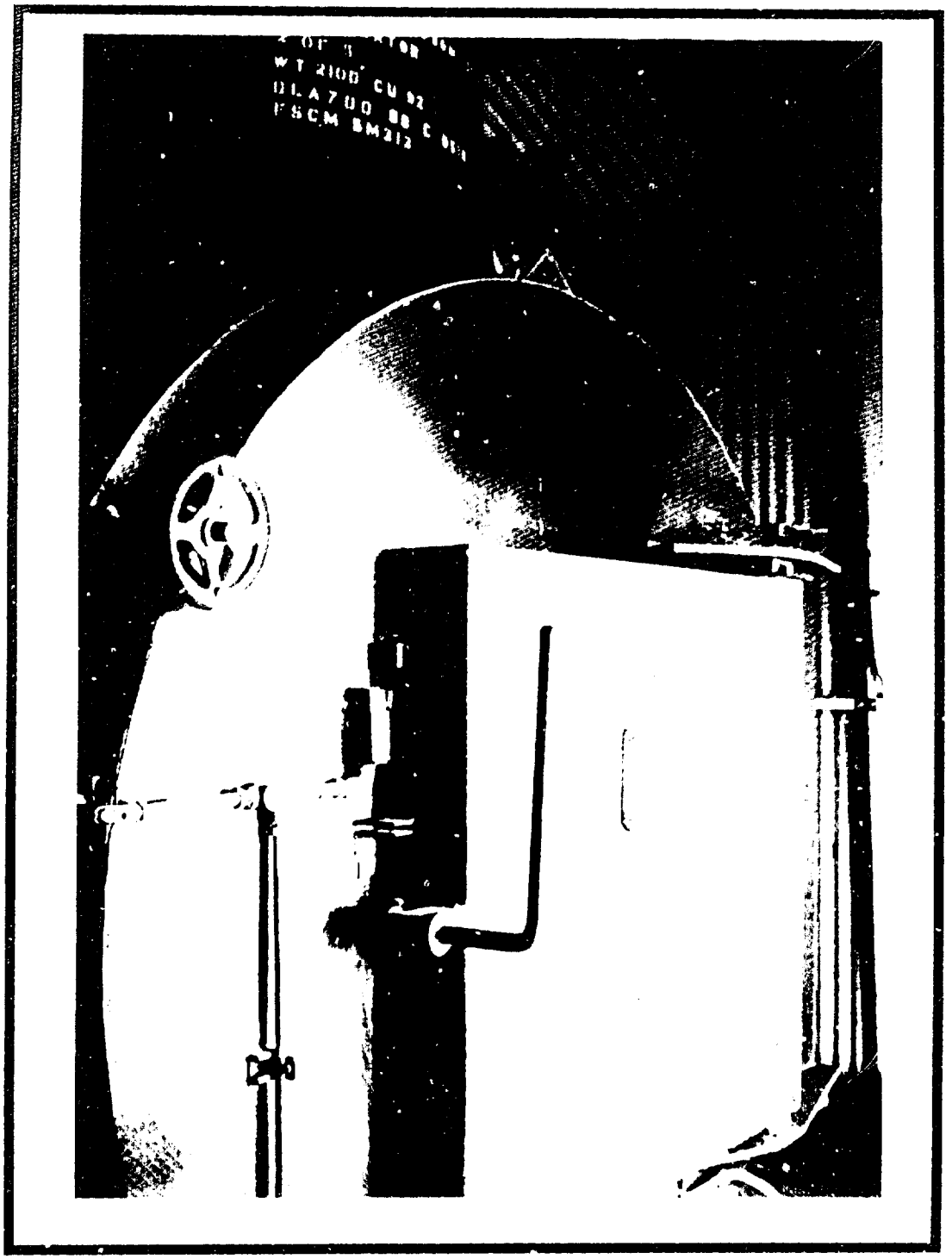


Figure 2. Incinerator Primary Chamber.

traverse) were required for a representative sample. The number of points required was determined based on the inside stack diameter, sampling port locations, and type of sampling conducted (particulate). Three sampling runs, one of 120 and two of 96 minute duration, were conducted and the results

averaged to determine final emission values. Sampling time of the last two runs was decreased based on flow rates.

Prior to the first sampling run, the degree of cyclonic flow was determined using a Type S (Stausscheibe) pitot tube to measure the stack gas rotational angle at each point along the center traverse. A straightening vane had been installed in the stack, based on a determination of excessive cyclonic flow during the Feb 92 emission survey attempt. Flow conditions are considered acceptable when the arithmetic mean of the rotational angles is 20 degrees or less. Measurements of cyclonic flow, with the straightening vane in place, were within acceptable limits. A preliminary velocity pressure traverse was accomplished with a Type S pitot tube at this time.

A grab sample was taken for Orsat analysis during each sampling run. Orsat analysis measures a sample's O_2 and CO_2 content for molecular weight determination (EPA Method 3). Orsat sampling equipment and analysis equipment are shown in Figures 3 and 4, respectively. Stack gas moisture content also is required for molecular weight calculations. Moisture content was determined from moisture collected during particulate/chloride sampling.

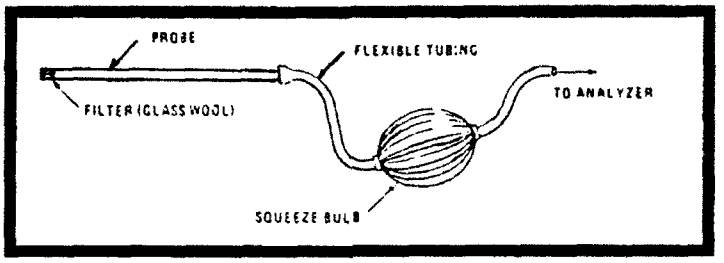


Figure 3. Orsat Grab Sampling Train.

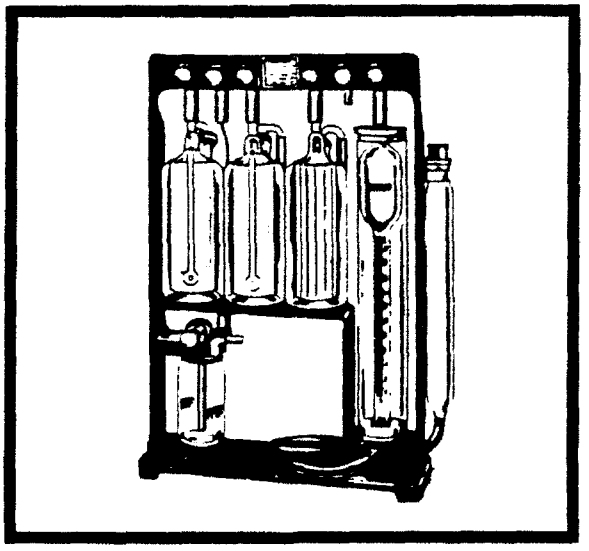


Figure 4. Orsat Analysis Apparatus.

Samples for particulate and chloride analysis were collected using the sampling train shown in Figure 5. The train consisted of a button-hook probe nozzle, heated glass-lined probe, heated glass fiber filter, impingers, and a pumping and metering device. The probe nozzle was selected to permit isokinetic sampling of the gas stream, i.e., sampling when the nozzle tip velocity is the same as the stack gas velocity at each point sampled. Stack gas velocity pressure was measured at the nozzle tip using a Type S pitot tube connected to a 10-inch inclined, vertical manometer. Type K thermocouples were used to measure stack gas and sampling train temperatures. The probe liner was heated to minimize moisture condensations. A heated filter was used to collect particulates. The impinger train consisted of four glass impingers in series. The impinger train was used as a condenser to collect stack gas moisture. The acid impingers were used to collect chlorides for subsequent hydrogen chloride determination. The first, third, and fourth impingers were a modified Greenburg-Smith design. The second impinger was a standard Greenburg-Smith design. The contents of each impinger were prepared for HCl sampling in accordance with EPA Method 26 ("Determination of Hydrogen Chloride Emissions from Stationary Sources"). The first and second impingers contained 100 milliliters (ml) of 0.1 normal (N) sulfuric acid (H_2SO_4). The third

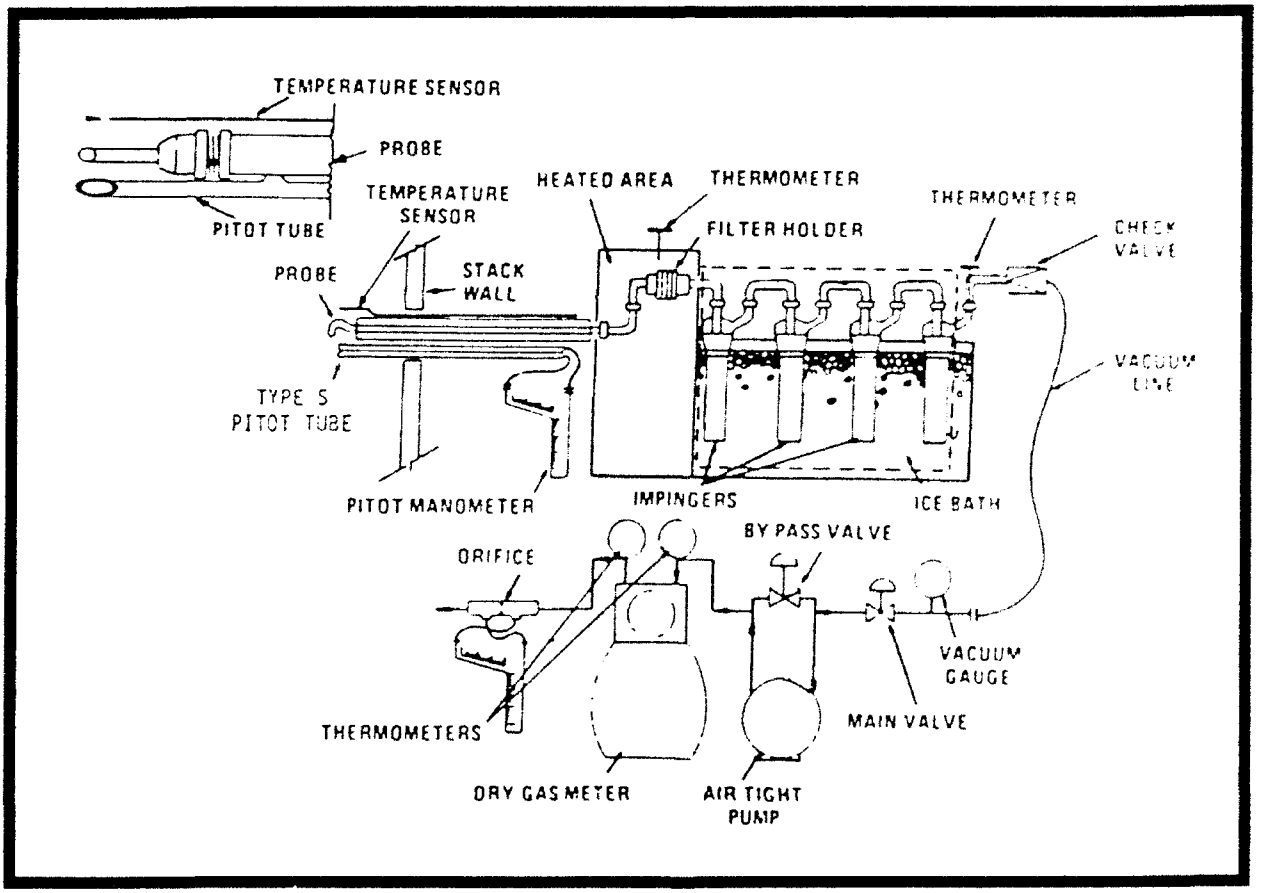


Figure 5. Particulate/Chloride Sampling Train.

impinger contained 100 ml of 0.1 N sodium hydroxide (NaOH). The fourth impinger contained 200 grams of silica gel. The pumping and metering system was used to control and monitor the sample gas flow rate. Equipment calibration data are in Appendix F (4).

The contents of impingers one and two, and the glassware rinse water, from each sampling run were combined and submitted to the Armstrong Laboratory Analytical Services Division for chloride analysis by ion chromatography. The results of these analyses are in Appendix G. Example calculations for hydrogen chloride determination are in Appendix H.

Front-half particulate matter (particulates deposited in the sampling train from the probe to the filter) was analyzed in accordance with EPA Method 5. Field data (traverse point calculation sheets, preliminary velocity and traverse data, particulate data sampling sheets, and visible emissions data) are in Appendix I. Visible emission (opacity) readings were conducted by personnel certified by the Texas Air Control Board. Emission calculations are in Appendix I. Emission calculations were performed using the "Source Test Calculation and Check Programs for Hewlett-Packard 41 Calculators" developed by the EPA Office of Air Quality Planning and Standards (5).

The incinerator was operated with a 300 lb/hr charge of Type 0 waste during the test. This is the maximum charge rate for routine operations. The maximum rated capacity for Type 0 waste for this incinerator is 500 lb/hr.

RESULTS AND DISCUSSION

Source testing was conducted on 12 and 13 Aug 92. Results of particulate sampling are provided in Table 1 (5). The particulate emission rate is expressed in both grains per dry standard cubic foot (gr/dscf) of stack gas and in lb/hr, columns five and six, respectively. The particulate emission rate during run 3 was 0.90 lb/hr less than during run 1 and 1.02 lb/hr less than during run 2. Particulate emissions variability was similar during the Sep 88 test (Appendix J). At that time, results of run 3 were 1.24 lb/hr and 0.85 lb/hr less than runs 1 and 2, respectively. The average particulate emission rate for all three test runs of this report is 2.56 lb/hr. This is similar to the Sep 88 test results of 2.67 lb/hr.

TABLE 1. Particulate Emission Results

Run #	Standard/Dry Sampling Gas Volume (dscf)	$\%O_2$	Particulate Mass Collected (mg)	Particulate Emission Rate (gr/dscf)	Particulate Emission Rate (lb/hr)
1	39.502	12.0	721.8	0.28	2.82
2	44.445	12.2	948.6	0.33	2.94
3	41.556	14.5	630.3	0.23	1.92
Avg	-	-	-	-	2.56

Hydrogen chloride concentration results are listed in Table 2. Results are reported in parts per million (ppm). The average stack concentration for all three runs was 26.6 percent (dry, corrected to 7 percent oxygen).

TABLE 2. Hydrogen Chloride Concentration Results

Run #	$\%O_2$	Liquid Sample Volume (ml)	Liquid sample Cl^- Concentration (mg/l)	HCl Emissions Corrected to 7% O_2 (ppm)
1	12.0	481.0	43.0	19.9
2	12.2	484.0	49.9	21.2
3	14.5	343.0	88.0	38.6
Avg	-	-	-	26.6

Hydrogen chloride emission results are listed in Table 3. Results are reported in lb/hr. The average stack emission rate for all three runs was 0.08 lb/hr.

TABLE 3. Hydrogen Chloride Emission Results

Run #	Standard Stack Flow Rate (dscfm)	Stack Gas HCl Concentration (mg/dscf)	HCl Emissions (lb/hr)
1	1165	0.539	0.08
2	1043	0.589	0.08
3	957	0.747	0.09
Avg	-	-	0.08

Stack test conditions are provided in Table 4. Average stack velocity was 9.32 feet per second (fps), 17 percent less than the Sep 88 test results. Stack gas composition averaged 12.9 percent oxygen and 6.2 percent carbon dioxide. Oxygen percentages ranged from 12.0 to 14.5 percent, while carbon dioxide percentages ranged from 5.1 to 6.8 percent. Primary (ignition) chamber temperature averaged 817 °F. Primary chamber temperature was 610 °F, 690 °F, and 1150 °F for runs 1, 2, and 3, respectively. Secondary (combustion) chamber temperature averaged 1560 °F during the three runs. Secondary chamber temperature was 1580 °F, 1500 °F, and 1600 °F for runs 1, 2, and 3, respectively. Isokinicity was 98.5, 97.7, and 99.5 percent for runs 1, 2, and 3, respectively.

TABLE 4. Stack Test Conditions

Run #	Stack Velocity fps	Stack Gas Temperature (°F)	Primary Chamber Temperature (°F)	Secondary Chamber Temperature (°F)	Stack Gas Oxygen Content (%)	Stack Gas Carbon Dioxide Content (%)
1	10.25	1369	610	1580	12.0	6.8
2	9.17	1361	690	1500	12.2	6.8
3	8.55	1360	1150	1600	14.5	5.1

The average 6-minute opacity reading averaged less than 5 percent for all three sampling runs. No reading exceeded 10 percent. Visible emission data is in Appendix I.

CONCLUSIONS

The classified waste incinerator exceeded the 0.85 lb/hr emission limit. The average particulate emission result of this test (2.56 lb/hr) is consistent with those of the Sep 88 test (2.67 lb/hr). The particulate matter was a white ash, indicating complete combustion.

The primary chamber temperatures, during runs 1 and 2, were below the 800 °F to 1000 °F range recommended by the manufacturer (Advanced Combustion Systems, Inc.). The low temperatures and observed turbulence in the primary chamber, and high particulate emissions indicate there is excessive draft in the primary chamber. This chamber should operate in a slightly starved air condition, approximately 80 percent of stoichiometric (approximately 6 percent oxygen). The excessive draft is likely responsible for carry-over of particulate matter into the secondary chamber and out the stack. This is the same conclusion of the Sep 88 test. Combustion is complete; the particulate matter was a white ash.

Stack gas oxygen content averaged 12.9 percent. This measurement indicates that the secondary (combustion) chamber is operating within the recommended total excess-air level of between 140 and 200 percent of stoichiometric (12 to 14 percent oxygen).

The 6-minute average opacity of the visible emissions was less than 5 percent. Additionally, no reading exceeded 10 percent. These readings are within the 20 percent 6-minute average opacity limits required by the State.

Hydrogen chloride emissions averaged 0.08 lb/hr, higher than the 0.02 lb/hr emissions of the Sep 88 test. The concentration was 26.6 ppm by volume, dry basis, corrected to 7 percent oxygen. Although there is no hydrogen chloride emissions standard applicable to this unit, these values are below state concentration and emission limits (i.e., 50 ppm and 4 lb/hr) for infectious waste incinerators.

RECOMMENDATIONS

The following are actions recommended to improve incinerator operations:

1. Adjust damper on underfeed blower to obtain the proper draft conditions. A draft of -0.05 to -0.1 inches water column is recommended. This should increase the primary chamber temperature and reduce turbulence in the chamber.

2. Adjust the air-to-fuel ratio on all burners to obtain proper combustion air level. The primary chamber should operate at a slightly starved air condition, 6 percent to 6.5 percent oxygen. [Stack gas oxygen levels indicate that the secondary chamber is adjusted properly.]

3. Ensure door gaskets seal properly.

4. Completely clean-out primary chamber, including underfire units.

The classified waste incinerator should be retested following completion of recommendations 1 through 4, above.

Additional actions that will facilitate proper incinerator adjustment include installation of a draft pressure gauge in both chambers, and installation of oxygen sensors in both chambers to measure combustion gas oxygen content.

The particulate emission rate determined during this source test survey differs from that listed in the Application for Permit to Construct or Certificate to Operate (Appendix E). Additionally, 6 NYCRR 201 should be thoroughly reviewed to ensure compliance with all applicable sections (2).

REFERENCES

1. Source Emission Testing of Classified Waste Incinerator, Griffiss AFB NY, USAFOEHL Report 89-031EQ0079DEF, April 1989.

2. Codes, Rules, and Regulations of the State of New York, Title 6, Parts 210 and 219, as amended 28 May 1992.

3. Code of Federal Regulations, Title 40, Parts 53-60, The Office of the Federal Register National Archives and Records Service, General Services Administration, Washington DC, July 1991.

4. Quality Assurance Handbook for Air Pollution Measurement Systems - Volume III, Stationary Source Specific Methods, U.S. Environmental Protection Agency, EPA-600/4-77-027-b, Research Triangle Park, North Carolina, December 1984.

5. Source Test Calculation and Check Programs for Hewlett-Packard 41 Calculators, U.S. Environmental Protection Agency, EPA-340/1-85-018, Research Triangle Park, North Carolina, May 1987.

APPENDIX A

Survey Request Letter

DEPARTMENT OF THE AIR FORCE
416TH MEDICAL GROUP (SAC)
GRIFFISS AIR FORCE BASE, NEW YORK 13441-5000

REPLY TO ATTN OF: SGP3

02 OCT 1991

SUBJECT: Reevaluation of Classified Waste Incinerator

TO: HQ SAC/SGP3
Armstrong Laboratory/OEBE (Capt Vaughn)

IN TURN

1. Request reevaluation of the classified waste incinerator at Griffiss AFB.

2. All recommendations made in section IV of USAFOEHL REPORT 89-031EQ0079DEF, Source Emission Testing of Classified Waste Incinerator, Griffiss AFB NY, have been complied with.

3. If there are any questions please call me at DSN 587-3153.

DONALD B. WATKINS, SMSgt, USAF
Supt, Bioenvironmental Engineering

cc: 416 SPTG/DEV
416 MSSQ/MSID

1st Ind, HQ SAC/SGP3, Offutt AFB NE 68113-5290 9 October 1991

TO: AL/OEBE

We support the 416 Medical Group request. We would like for your organization to schedule the reevaluation within the next 120 days if possible.

RONALD L. SCHILLER, Colonel, USAF, BSC
Chief, Bioenvironmental Engineering
Office of the Surgeon

APPENDIX B

Personnel Information

PERSONNEL INFORMATION

1. Armstrong Laboratory Air Quality Test Personnel

   Capt Dennis Sylvia, Air Quality Meteorologist, Project Officer
   Capt Robert O'Brien, Air Quality Consultant
   TSgt Mark Bishop, Air Quality Technician
   SSgt Edward Primeau, Air Quality Technician

   AL/OEBE
   2402 E Drive
   Brooks AFB TX 78235-5114

   Phone: DSN 240-3305
   Comm (210) 536-3305

2. Griffiss AFB On-Site Representatives

   SMSgt Donald Watkins, 416 MG/SGPB
   SSgt Dana Durand, 416 MG/SGPB
   SSgt Lassiter, 416 MG/SGPB

   416 MG/SGPB
   125 Brookley Road
   Griffiss AFB NY 13441-4301

   Phone (416 MG/SGPB): DSN 587-5661
   Comm (315) 339-5661

   Mr Bruce Mero, 416 CES/CEV, DSN 587-2098, Comm (315) 339-2098
   Ms Barbara Jones, 416 MSS/MSIR, DSN 587-3114, Comm (315) 339-3114

3. Advanced Combustion Systems, Inc.

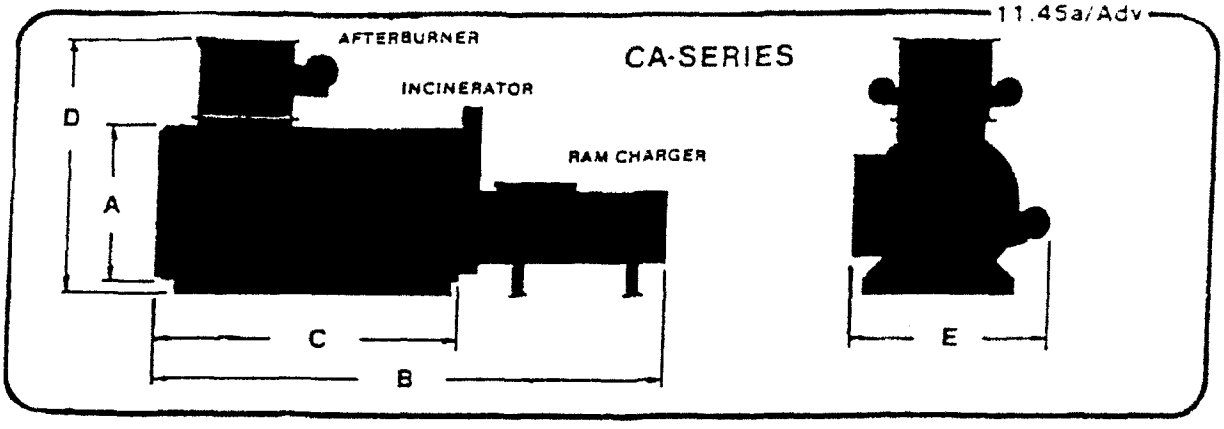
   Mr Scott Frolich, Project Engineer, Comm (206) 676-6005

4. New York State Department of Environmental Conservation

   Mr David Hathaway, Region 6, Comm (315) 793-2554

APPENDIX C

Equipment Specifications



ADVANCED COMBUSTION ENGINEERING, INC.
MODEL CA-750 SPECIFICATIONS

UNITS	A DIAMETER	B LENGTH	C LENGTH	D HEIGHT	E WIDTH	STACK DIAMETER	TOTAL STACK HEIGHT
Feet	7.00	20.42	11.50	10.67	10.0	3.50	28.67
Meters	2.13	6.22	3.51	3.25	3.05	1.07	8.74

EQUIPMENT SPECIFICATION

Incinerator Model No. CA-750 STANDARD UNIT

2-750-08

SS

RATED CAPACITY:

Type "0"	500	lbs/hr.
Type "1"	750	lbs/hr.
Type "2"	940	lbs/hr.
Type "3"		lbs/hr.
Type "4"	375	lbs/hr.
Other	Contact Factory	
Maximum Charge	7.5	cu. yd.

AUXILIARY BURNERS: (Gas or Oil)

Primary Chamber:

1--Adjustable to 800,000 BTU/Hr.

Afterburner:

2--Adjustable to 1,200,000 BTU/Hr.

BASIC DIMENSIONS:

	Pri. Chamber	Sec. Chamber	Exhaust Stack
Outside Diameter	84"	46"	42"
Shell Thickness	¼"	10 ga	12 ga
Insulation	(1900°) 2"	(air cooled) 2"	
Refractory	(2700°) 4"	(2900°) 3"	(2300°) 3"
Inside Diameter	72"	36"	36"
Chamber Length	114"	34"	
Chamber Volume	268 Ft.³	20 Ft.³	
Hearth Area	57 Ft.²		
Inlet Inside Diameter		18"	36"
Section Length			6'-0"
No. of Sections			3
Total Height from Slab			28'-8"
Weight	21,800 lbs	1,900 lbs	6,300 lbs

UTILITY REQUIREMENTS

Fuel:	Nat. Gas	#2 Oil
Max. Firing.....	3200 CFH	22.8 GPH
Average w/Temp. Control on Afterburner.....	1600 CFH	11.4 GPH
Average w/Temp. Control on Pri. Chamber & Afterburner.....	800 CFH	5.7 GPH

Actual fuel consumption may vary according to waste type being incinerated.

Electrical Service:

230 Volts
4 Wire
3 Phase
40 Amp
3 HP
60 Hz.

Reference ACS Dwg. B-1963

ADVANCED COMBUSTION

APPENDIX D

State Regulations

APPENDIX 2

TABLE 1

Classification of Refuse

(1) Type	(2) Principal Components	(3) Approximate Composition % by Weight	(4) Approximate Moisture Content % by Weight	(5) Approximate Incombustible Solids % by Weight	(6) Approximate B.T.U. per Pound of Refuse
0	Rubbish consisting of highly combustible materials such as paper, wood and card-board including up to 10% treated papers, rags, plastic or rubber from commercial and industrial sources	Rubbish 100%	10%	5%	8500
1	Some garbage but primarily rubbish consisting of combustible material such as paper, cardboard, wood, combustible floor sweepings from residential, commercial and industrial sources	Rubbish 80% Garbage 20%	25%	10%	6500
2	Rubbish and garbage from residential sources	Rubbish 50% Garbage 50%	50%	7%	4300
3	Some rubbish, but primarily garbage con-sisting of animal and vegetable matter from restaurants, hotels, markets, institutional and commercial sources	Garbage 65% Rubbish 35%	70%	5%	2500
4	Human and animal solid refuse consisting of carcasses and organs from hospitals laboratories, abattoirs, animal pounds and similar sources	100% animal and Human Tissue	85%	5%	1000
5	Gaseous, liquid or semi-liquid refuse from processes such as tar, paints, solvents and chemical sludge	Variable	Dependent on pre-dominant components	Variable	Variable
6	Solid or semi-solid refuse from processes such as rubber, plastics, wood and sewage sludge.	Variable	Dependent on pre-dominant components	Variable	Variable

SUBPART 219-5
EXISTING INCINERATORS

219-5.1 Applicability. This Subpart applies to any incinerator which was installed or constructed or for which an application for a permit to construct was received prior to the applicability date of Subpart 219-2 located in the State of New York except New York City and Nassau and Westchester Counties.

219-5.2 Emission limits. (a) All incinerators having a capacity of 2000 lb/hr or less and built and installed after January 1, 1968, must be designed, built, installed and operated to meet the emission limits of figure 1*.

(b) No incinerator larger than 2000 lb/hr capacity and built after January 1, 1970, will be operated so as to produce particulate emissions which exceed the amount shown in figure 1*.

(c) No incinerator having a capacity of 2000 lb/hr or less and built or installed between April 1, 1962, and January 1, 1968, will be operated so as to produce particulate emissions which exceed 0.5 lb/hr for every 100 lb/hr of refuse charged, unless a final order of the commissioner provides otherwise

(d) Any incinerator having a capacity of 2000 lb/hr or less and built or installed prior to April 1, 1962, must either meet the requirements of 219-5.2(c) or must be equipped with adequate control devices or redesigned and rebuilt so as to meet the requirements of 219-5.2(a) by January 1, 1969.

(e) No incinerator larger than 2000 lb/hr capacity and built between April 1, 1962, and January 1, 1970, will be operated so as to produce particulate emissions which exceed 0.5 lb/hr for every 100 lb/hr of refuse charged, unless a final order by the commissioner provides otherwise.

(f) Any incinerator larger than 2000 lb/hr capacity and built prior to April 1, 1962, must either meet the requirements of 219-5.2(e) or must be equipped with adequate control devices or redesigned and rebuilt to meet the requirements of 219-5.2(b) by January 1, 1970

219-5.3 Opacity of emissions. (a) No incinerator, built or installed after January 26, 1967, regardless of size, will emit visible emissions having an average opacity during any six consecutive minutes of greater than 20 percent, under normal operating conditions.

(b) No incinerator built or installed prior to January 26, 1967, regardless of size, will be operated so as to emit visible emissions having an average opacity during any six consecutive minutes of greater than 20 percent, under normal operating conditions.

219-5.4 Tests. (a) All incinerators larger than 2000 lb/hr capacity must be tested using emission tests acceptable to the commissioner.

(b) All incinerators built or installed after January 1, 1968 and having a capacity of 2000 lb/hr or less must be tested using emission tests acceptable to the commissioner. Units which are representative models may be tested instead of an actual installation, using emission tests acceptable to the commissioner.

219-5.5 Abatement. (a) Where the commissioner has reason to believe that an incinerator installation is violating the emission standards of section 219-5.2 of this Subpart, he may have tests conducted. The owner must provide, at his expense, sampling holes and pertinent allied facilities as needed, at the request of the commissioner.

(b) If such tests indicate a contravention of the emission limits, the commissioner may require the installation of appropriate control equipment or he may seal the incinerator if such equipment is not installed within the time limit specified by the commissioner.

(c) The commissioner may order the cleaning, repair, replacement or alteration of any equipment or control equipment which causes or is operated so as to cause a violation of this Subpart.

(d) The commissioner may order a change in the manner of operation of an incinerator which is operated so as to cause a violation of this Subpart.

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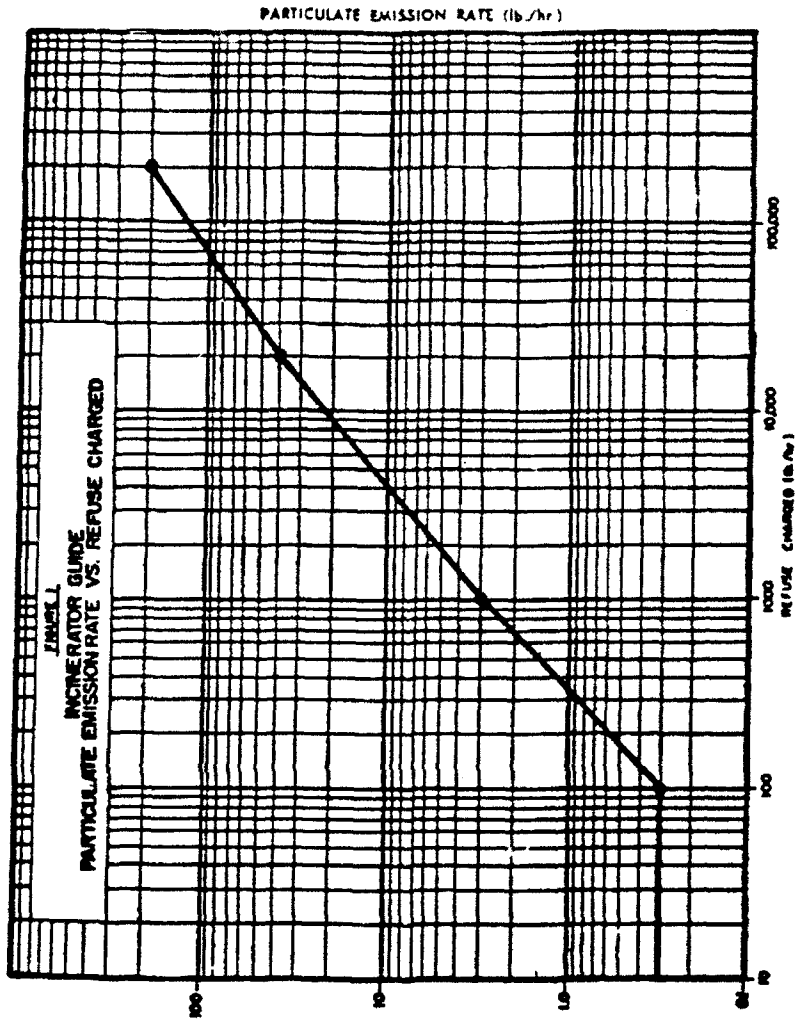
* See Appendix 2, infra.

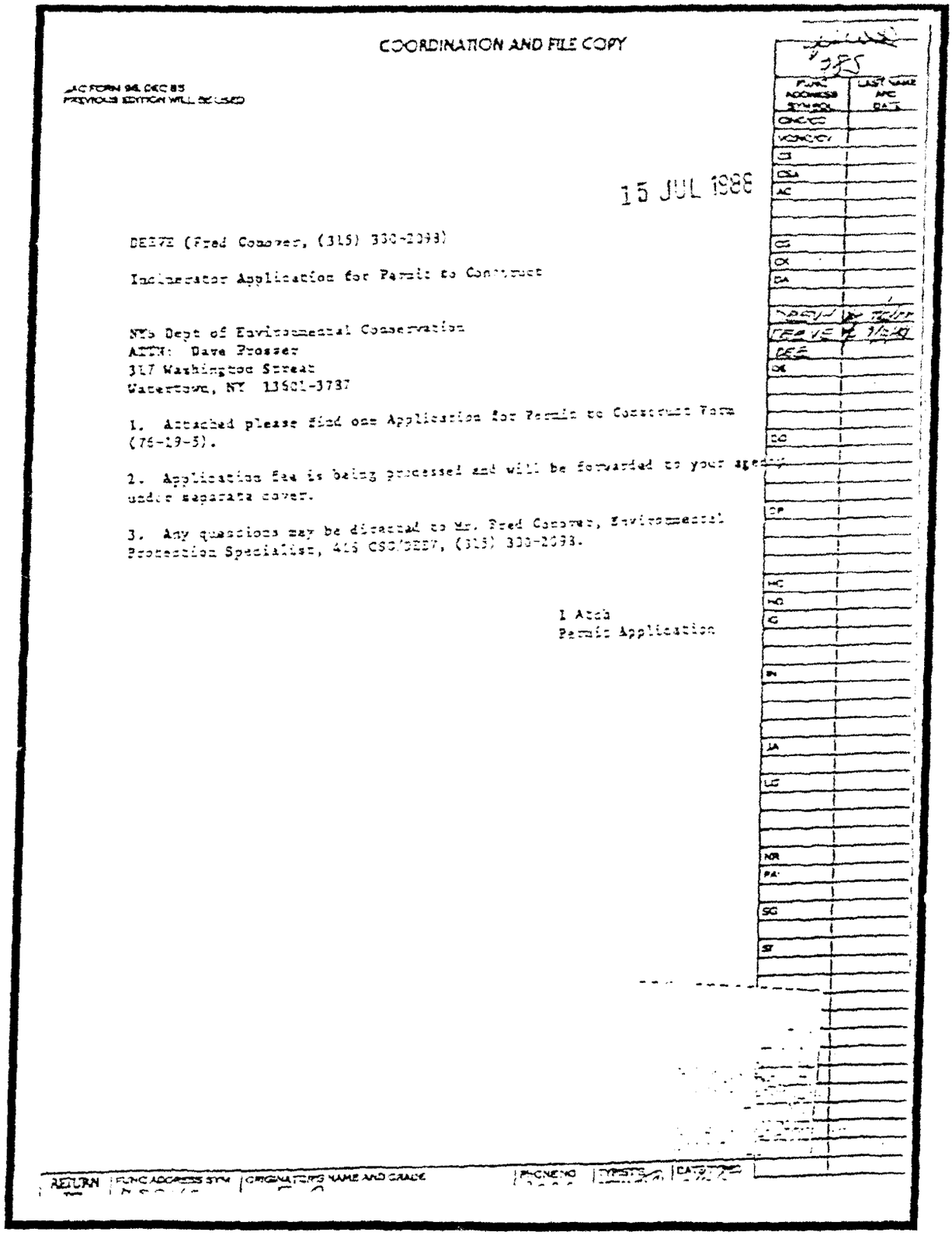
§219-5 Figure 1

APPENDIX 2



APPENDIX E

Application for Permit to Construct



COORDINATION AND FILE COPY

AC FORM 96, DEC 83
PREVIOUS EDITION WILL BE USED

15 JUL 1988

DEEVE (Fred Conover, (315) 330-2098)

Incinerator Application for Permit to Construct

NYS Dept of Environmental Conservation
ATTN: Dave Prosser
317 Washington Street
Watertown, NY 13601-3787

1. Attached please find one Application for Permit to Construct Form (75-19-5).

2. Application fee is being processed and will be forwarded to your agency under separate cover.

3. Any questions may be directed to Mr. Fred Conover, Environmental Protection Specialist, 416 CSG/DEEV, (315) 330-2098.

I Atch
Permit Application

RETURN | FUNC ADDRESS SYM | ORIGINATOR'S NAME AND GRADE | PHONE NO | SYMBOL | DATE

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

INCINERATOR

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

Name of owner/firm	US Air Force
Number and street address	Griffiss AFB
City/town/village	Griffiss AFB
State	NY
Zip	13441
Name of authorized agent	N/A
Telephone	N/A
Number and street address	N/A
City/town/village	N/A
State	N/A
Zip	N/A
Building	3/19
Floor	N/A
Start up date	TBA /
Owner classification	Federal
Name & title of owner's representative	JOSEPH V. LINK, Col, USAF, Base Civil Engineer
Telephone	(315) 330-3416
Permit to construct	New source

Emission point ID	Ground elevation (ft)	Height above structures (ft)	Stack height (ft)	Inside dimensions (in)	Exit temperature (°F)	Exit velocity (ft/sec)	Exit flow (acfm)
1 1 9 8	469	12	29	36	1468	20	5344

Refuse fees	Unit type	Unit manufacturer's name and model number
03	03	Advanced Combustion Systems, Inc. CA-750

Refuse type	Capacity	Amount refuse charged	Hrs/day	Days/yr	% operation by season
0	750	N/A	8	130	25 25 25 25
1	750	N/A	8	130	25 25 25 25

Emission control	Control type	Manufacturer's name and model number
193	10	Advanced Combustion Systems, Inc. CA-750

Calculations

Information taken from an "Atmospheric Emission Evaluation". Performed by: AIA Consultants, November 7, 1985. Test was on. Advanced Combustion Systems, Inc. -CA-750- Incinerator XXXXXX burning Type 0 Waste - 2133 East Bakerview Road, Bellingham, Washington 98226. Copies of this report are available from the applicant.

Contaminant name	CAS number	Emissions actual	Units	% control efficiency	Hourly emissions actual	Annual emissions actual
TOTAL PARTICULATES	99079-00-0	3.55×10^{-5}	2	N/A	8.55×10^{-5}	.1799
SULFUR DIOXIDE	7446-09-5					

PERMIT TO CONSTRUCT

RECOMMENDED ACTION

APPENDIX F

Equipment Calibration Data

NOZZLE CALIBRATION DATA FORM

Date 12 Aug 92 Calibrated by D. Sylvia

Nozzle identification number	Nozzle Diameter[a]			ΔD,[b] mm (in.)	D_{avg}[c]
	D_1, mm (in.)	D_2, mm (in.)	D_3, mm (in.)		
1	19.4	19.4	19.4	0.0	19.4 (0.768)
2	15.5	15.4	15.5	0.1	15.47 (0.610)

where:

[a] $D_{1,2,3}$, = three different nozzles diameters, mm (in.); each diameter must be within (0.025 mm) 0.001 in

[b] ΔD = maximum difference between any two diameters, mm (in.), $\Delta D \leq$ (0.10 mm) 0.004 in.

[c] D_{avg} = average of D_1, D_2, and D_3

Quality Assurance Handbook MS-2.6

METER BOX CALIBRATION DATA AND CALCULATION FORM

(English units)

Date 3 JUN 92 Meter box number 5

Barometric pressure, P_b = 29.055 in. Hg Calibrated by VAUGHAN / JAGIELSKI

ΔAC	Orifice manometer setting (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperatures: Wet test meter (t_w), °F	Temperatures: Dry gas meter: Inlet (t_{d_i}), °F	Temperatures: Dry gas meter: Outlet (t_{d_o}), °F	Temperatures: Dry gas meter: Avg[a] (t_d), °F	Time (θ), min	Y_i	$\Delta H@_i$ in. H_2O
4.0	0.5	5	4.90	76 78 77	77 81 79	76 78 77	78	11.97	1.021	1.676
7.0	1.0	5	4.975	78 80 79	81 86 83.5	78 81 79.5	81.5	8.82	1.007	1.871
6.6	1.5	10	9.95	80 77 78.5	86 93 89	81 84 82.5	85.75	14.87	1.013	1.923
6.0	2.0	10	9.985	77 77 77	92 95 93.5	87 87 87	89.5	12.84	1.018	1.888
6.0	3.0	10	10.01	77 76 76.5	95 99 97	87 89 88	92.5	10.95	1.015	2.045
8.9	4.0	10	9.935	76 76 76	99 101 100	87 93 90	95	9.11	1.032	1.875
								Avg	1.018	1.871

ΔH, in. H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6})(t_w + 460)}$	$\Delta H@_i = \frac{0.0317\ \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
0.5	0.0368	$\frac{(5)(29.055)(78+460)}{(4.9)(29.055+\frac{.5}{13.6})(77+460)} = 1.021$	$\frac{(0.0317)(.5)}{29.055(78+460)}\left[\frac{(77+460)(11.97)}{5}\right]^2 = 1.676$
1.0	0.0737	$\frac{(5)(29.055)(81.5+460)}{(9.975)(29.055+\frac{1.0}{13.6})(79+460)} = 1.007$	$\frac{(0.0317)(1.0)}{29.055(81.5+460)}\left[\frac{(79+460)(8.82)}{5}\right]^2 = 1.871$
1.5	0.110	$\frac{(10)(29.055)(85.75+460)}{(9.95)(29.055+\frac{1.5}{13.6})(78.5+460)} = 1.013$	$\frac{(0.0317)(1.5)}{29.055(85.75+460)}\left[\frac{(78.5+460)(14.87)}{10}\right]^2 = 1.923$
2.0	0.147	$\frac{(10)(29.055)(89.5+460)}{(9.985)(29.055+\frac{2.0}{13.6})(77+460)} = 1.018$	$\frac{(0.0317)(2.0)}{29.055(89.5+460)}\left[\frac{(77+460)(12.84)}{10}\right]^2 = 1.888$
3.0	0.221	$\frac{(10)(29.055)(92.5+460)}{(10.01)(29.055+\frac{3.0}{13.6})(76.5+460)} = 1.015$	$\frac{(0.0317)(3.0)}{29.055(92.5+460)}\left[\frac{(76.5+460)(10.95)}{10}\right]^2 = 2.045$
4.0	0.294	$\frac{(10)(29.055)(95+460)}{(9.935)(29.055+\frac{4.0}{13.6})(76+460)} = 1.032$	$\frac{(0.0317)(4.0)}{29.055(95+460)}\left[\frac{(76+460)(9.11)}{10}\right]^2 = 1.875$

[a] If there is only one thermometer on the dry gas meter, record the temperature under t_d.

Quality Assurance Handbook MS-2.3A (front side)

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English units)

Test numbers _____ Date 7 Sep 92 Meter box number 5 Plant Griffis (lost)

Barometric pressure, P_b = 29.255 in. Hg Dry gas meter number 1 Pretest Y 1.018

Orifice manometer setting, (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Wet test meter (t_w), °F	Temperature: Dry gas meter: Inlet (t_{d_i}), °F	Temperature: Dry gas meter: Outlet (t_{d_o}), °F	Temperature: Dry gas meter: Average[a] (t_d), °F	Time (θ), min	Vacuum setting, in. Hg	Y_i	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
0.62	10	9.975	76	88	84	86	22.753	5.0	1.0196	10(29.255)(86+460) / 9.975(29.255+.62/13.6)(76+460)
0.62	10	9.91	76	90.5	88	89.25	22.606	5.0	1.032	10(29.255)(89.25+460) / 9.91(29.255+.62/13.6)(76+460)
0.62	10	9.885	76	91	89	90	22.610	5.0	1.036	10(29.255)(90+460) / 9.885(29.255+.62/13.6)(76+460)
									Y = 1.029	

[a] If there is only one thermometer on the dry gas meter, record the temperature under t_d.

Acceptable Range

0.967 - 1.0689

V_w = Gas volume passing through the wet test meter, ft^3.

V_d = Gas volume passing through the dry gas meter, ft^3.

t_w = Temperature of the gas in the wet test meter, °F.

t_{d_i} = Temperature of the inlet gas of the dry gas meter, °F.

t_{d_o} = Temperature of the outlet gas of the dry gas meter, °F.

t_d = Average temperature of the gas in the dry gas meter, obtained by the average of t_{d_i} and t_{d_o}, °F.

ΔH = Pressure differential across orifice, in. H_2O.

Y_i = Ratio of accuracy of wet test meter to dry gas meter for each run.

Y = Average ratio of accuracy of wet test meter to dry gas meter for all three runs; tolerance = pretest Y ±0.05Y

P_b = Barometric pressure, in. Hg.

θ = Time of calibration run, min.

Quality Assurance Handbook M5-2.4A

APPENDIX G

Laboratory Analysis for Chlorides

AIR FORCE
OCCUPATIONAL AND ENVIRONMENTAL HEALTH DIRECTORATE
BROOKS AFB, TEXAS, 78235-5000

REPORT OF ANALYSIS

BASE SAMPLE NO: CN920006

SAMPLE TYPE: NON-POTABLE WATER

SITE IDENTIFIER: DATE RECEIVED: 920902

DATE COLLECTED: 920812 DATE REPORTED: 920910

DATE REPRINTED: 920922

SAMPLE SUBMITTED BY: 416 MEDICAL GROUP/MGPB

PRESERVATION GROUP G OEHL SAMPLE NUMBER: 92052395

Test	Results	Units	Method
Chloride	43.0	mg/L	EPA 325.2

Comments:

SAMPLE ANALYZED BY ION CHROMOGRAPH.

Reviewed by: COPY

Dury1 S. Bird, GS-12
Chief, Inorganic Analysis Function

TO:

AL/OEBE
ATTN: MAJ GARLAND
BROOKS AFB, TX 78235-5501

PAGE 1

AIR FORCE
OCCUPATIONAL AND ENVIRONMENTAL HEALTH DIRECTORATE
BROOKS AFB, TEXAS, 78235-5000

REPORT OF ANALYSIS

BASE SAMPLE NO: CN920007

SAMPLE TYPE: NON-POTABLE WATER

SITE IDENTIFIER: DATE RECEIVED: 920902

DATE COLLECTED: 920813 DATE REPORTED: 920910

DATE REPRINTED: 920922

SAMPLE SUBMITTED BY: 416 MEDICAL GROUP/MGPB

PRESERVATION GROUP G OEHL SAMPLE NUMBER: 92052396

Test	Results	Units	Method
Chloride	49.9	mg/L	EPA 325.2

Reviewed by: COPY

Duryl S. Bird, GS-12
Chief, Inorganic Analysis Function

TO:

AL/OEBE
ATTN: MAJ GARLAND
BROOKS AFB, TX 78235-5501

PAGE 1

AIR FORCE
OCCUPATIONAL AND ENVIRONMENTAL HEALTH DIRECTORATE
BROOKS AFB, TEXAS, 78235-5000

REPORT OF ANALYSIS

BASE SAMPLE NO: CN920008

SAMPLE TYPE: NON-POTABLE WATER

SITE IDENTIFIER: DATE RECEIVED: 920902

DATE COLLECTED: 920813 DATE REPORTED: 920910

DATE REPRINTED: 920922

SAMPLE SUBMITTED BY: 416 MEDICAL GROUP/MGPB

PRESERVATION GROUP G OEHL SAMPLE NUMBER: 92052397

Test	Results	Units	Method
Chloride	88.0	mg/L	EPA 325.2

Reviewed by: COPY

Duryl S. Bird, GS-12
Chief, Inorganic Analysis Function

TO:

AL/OEBE
ATTN: MAJ GARLAND
BROOKS AFB, TX 78235-5501

PAGE 1

AIR FORCE
OCCUPATIONAL AND ENVIRONMENTAL HEALTH DIRECTORATE
BROOKS AFB, TEXAS, 78235-5000

REPORT OF ANALYSIS

BASE SAMPLE NO: BK920009

SAMPLE TYPE: BLANK/CONTROL SAMPLE

SITE IDENTIFIER: DATE RECEIVED: 920902

DATE COLLECTED: 920813 DATE REPORTED: 920910

DATE REPRINTED: 920922

SAMPLE SUBMITTED BY: 416 MEDICAL GROUP/M B

PRESERVATION GROUP G OEHL SAMPLE NUMBER: 92052398

Test	Results	Units	Method
Chloride	<.3	mg/L	EPA 325.2

Comments:

SAMPLE ANLAYZED BY ION CHROMOGRAPH.
< - Signifies none detected and the detection limits.

Reviewed by: COPY

Duryl S. Bird, GS-12
Chief, Inorganic Analysis Function

TO:

AL/OEBE
ATTN: MAJ GARLAND
BROOKS AFB, TX 78235-5501

PAGE 1

APPENDIX H

Example Calculations

Procedures for Calculating Hydrogen Chloride Concentrations

Step 1: Calculate the mass of hydrogen chloride (HCl) in the liquid sample.

$$m = S * V * 36.46/35.453$$

Where:

m = mass of HCl in liquid sample (μg)
S = concentration of chlorides in liquid sample (μg Cl^-/ml)
V = volume of liquid sample (ml)
36.46 = molecular weight of HCl ($\mu g/\mu g$-mole)
35.453 = molecular weight of Cl^- ($\mu g/\mu g$-mole)

Step 2: Calculate the concentration of HCl in the stack gas.

$$C = [K * m]/V_m$$

Where:

$C_{mg/dscf}$ = concentration of HCl, dry basis (mg/dscf)
$K = 10^{-3}$ mg/μg
m = mass of HCl in liquid sample (μg)
V_m= dry gas volume measured by the dry gas meter, corrected to standard conditions (dscf)

Step 3: Convert HCl concentration into units of parts per million (ppm)

$$ppm = [mg/dscf * 35.31\ dscf/dscm] * 24.45/36.46$$

Where:

24.45 = constant
36.46 = molecular weight of HCl

Step 4: Correct HCl concentration to 7 percent oxygen (O_2)

$$ppm\ (at\ 7\%\ O_2) = ppm * [(20.9-7)/(20.9-\%O_2)]$$

Where:

20.9 = percent oxygen in ambient air

$\%O_2$ = percent oxygen measured in stack gas

Step 5: Convert HCl concentration to pounds per hour (lb/hr)

$$lb/hr = C * V_m/t * [2.205 * 10^{-6}\ lb/mg]$$

Where:

$C_{mg/dscf}$ = concentration of HCl, dry basis (mg/dscf)

V_m = dry gas volume measured by the dry gas meter, corrected to standard conditions (dscf)

t = duration of test, expressed in hours

$2.205 * 10^{-6}$ = conversion factor from milligrams (mg) to pounds (lb)

Example Calculation for Hydrogen Chloride Concentration - Run 1

$$m = 49.9\ \mu g\ Cl^-/ml * 484\ ml * 36.46 / 35.453 = 24{,}838\ \mu g$$

$$C_{mg/dscf} = [10^{-3}\ mg/\mu g * 24{,}838\ \mu g] / 44.445\ dscf = 0.5588\ mg/dscf$$

$$ppm = [0.5588\ mg/dscf * 35.31\ dscf/dscm] * 24.45/36.4 = 13.23\ ppm$$

$$ppm\ (at\ 7\%\ O_2) = 13.23\ ppm * [(20.9 - 7) / (20.9 - 12.23)] = 21.21\ ppm$$

$$C_{lb/hr} = 0.5588\ mg/dscf * (44.445\ dscf/1.6\ hr) * (2.205 * 10^{-6}\ lb/mg) =$$

0.000034 lb/hr

APPENDIX I

Field Data

DETERMINATION OF MINIMUM NUMBER OF TRAVERSE POINTS

Stack ID: Classified Waste Incin Stack diameter at ports: 3 (ft)

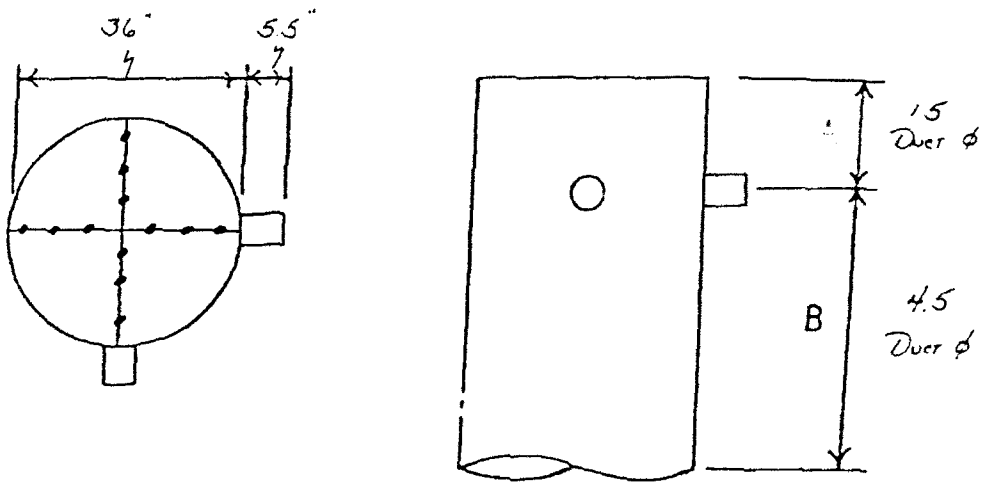
Distance A (ft) 45 (duct diameters) 15

Recommended number of traverse points as determined by distance A: 20

Distance B (ft) 13.5 (duct diameters) 4.5

Recommended number of traverse points as determined by distance B: 24

Number of traverse points used: 24



PRELIMINARY SURVEY DATA SHEET NO. 2

(Velocity and Temperature Traverse)

BASE	DATE
Griffiss AFB	11 Aug 92

BOILER NUMBER: Classified Waste Incinerator

INSIDE STACK DIAMETER: 36 Inches

STATION PRESSURE: 29.84 In Hg

STACK STATIC PRESSURE ✓: -0.065 In H20

SAMPLING TEAM: AL/OEBQ

TRAVERSE POINT NUMBER	VELOCITY HEAD, V_p IN H_2O	$\sqrt{V_p}$ CALCULATE ✓	STACK TEMPERATURE (°F)
1	0.010	5	1338
2	0.010	5	1326
3	0.010	5	1353
4	0.010	5	1354
5	0.012	6	1353
6	0.010	7	1342
7	0.015	7	1341
8	0.018	7	1336
9	0.020	5	1332
10	0.018	7	1316
11	0.015	5	1298
12	0.012	4	1283
$\bar{T}$ = 1314			
FPS = 12.0			
FPM = 709			
$\bar{V}P$ = 0.01			
AVERAGE			

OEHL FORM APR 78 16

Run 1

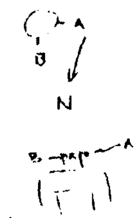
Source Test Calculation and Check Program
Output of Run 1

IMP. % HOH	6.6
% HOH	6.6
MWd	29.57
MW WET	28.81
VOL MTR STD	39.502
STK PRES ABS	29.74
VOL HOH GAS	2.77
% MOISTURE	6.56
MOL DRY GAS	0.934
% NITROGEN	81.17
MOL WT DRY	29.57
MOL WT WET	28.81
VELOCITY FPS	10.25
STACK AREA	7.07
STACK ACFM	4,346.
STACK DSCFM	1,165.
% ISOKINETIC	98.46
F GR/DSCF	0.28
F MG/MMM	645.27
F LB/HR	2.82
F KG/HR	1.28

PARTICULATE SAMPLING DATA SHEET

0.7853 [illegible]

RUN NUMBER: 1	SCHEMATIC OF STACK CROSS SECTION	EQUATIONS	AMBIENT TEMP: °F
DATE: 1~~1~~2 Aug 92		$^{\circ}R = ^{\circ}F + 460$	STATION PRESS: 29.74 in Hg
PLANT: Class. Waste Incinerator		$H = \left[\frac{5130 \cdot Fd \cdot Cp \cdot A}{Co}\right]^2 \cdot \frac{Tm}{Ts} \cdot Vp$	HEATER BOX TEMP: 250 +/- 25 °F
BASE: Griffiss AFB			PROBE HEATER SETTING
SAMPLE BOX NUMBER			PROBE LENGTH: 48 in
METER BOX NUMBER: # 5 Y=1.018		207.297	~~NOZZLE AREA (A)~~ NOZZLE DIAMETER: 0.619 sq ft
Qw/Qm: -	HON · 0.065 ΔH@ 1.871	Pre-leak check:	Cp: .84
Co: -	Time: EDT	Post leak Check:	DRY GAS FRACTION (Fd): -



TRAVERSE POINT NUMBER	SAMPLING TIME (min)	STATIC PRESSURE (in H2O)	STACK TEMP 1 (°F)	STACK TEMP (Ts) (°R)	VELOCITY HEAD (Vp)	ORIFICE DIFF. PRESS. (H)	GAS SAMPLE VOLUME (cu ft)	GAS METER TEMP 6 IN (°F)	GAS METER TEMP AVG (Tm) (°R)	GAS METER TEMP 7 OUT (°F)	3 SAMPLE BOX TEMP (°F)	4 IMPINGER OUTLET TEMP (°F)
A 1	5	1.5	1350	—	0.005	0.20	223.665	95	—	93	263	76
2	10	1.5	1402		0.005	0.19		91		93	260	48
3	15	1.2	1425		0.005	0.17		90		93	261	49
4	20	1.2	1446		0.005	0.19		90		92	263	50
5	25	1.3	1446		0.005	0.17		87		90	259	42
6	30	1.2	1445		0.008	0.30		86		81	255	50
7	35	1.5	1435		0.010	0.37		79		83	249	41
8	40	1.8	1437		0.018	0.67		77		82	249	44
9	45	2.1	1440		0.020	0.74		77		80	252	45
10	50	2.2	1442		0.020	0.74		82		81	256	50
11	55	2.2	1438		0.020	0.74		77		79	254	48
12	60	2.2	1391		0.015	0.57		77		78	253	48
	Avg meter temp	91										
	" stack	1369										
	" ΔH	0.39										
	Avg √Δp	.1168										

OEHL FORM MAY 78 18 √ ΔPs = 2.06 [illegible] 54.42 stk [illegible] 29.79 [illegible] 2.77 % moist 6.54 [illegible]

PARTICULATE SAMPLING DATA SHEET

RUN NUMBER	1
DATE	12 Aug 92
PLANT	
BASE	
SAMPLE BOX NUMBER	
METER BOX NUMBER	#5 1.018
Qw/Qm	
Co	

SCHEMATIC OF STACK CROSS SECTION

110H 0.065
29.71 bar press
ΔH@ 1.871

EQUATIONS

$$°R = °F + 460$$

$$H = \left[\frac{5130 \cdot Fd \cdot Cp \cdot A}{Co}\right]^2 \frac{Tm}{Ts} \cdot Vp$$

247.992 − 207.297 = 40.695
223.665 − 207.297 = 16.368
219.625 − 207.297 = 12.328

AMBIENT TEMP (°F)	
STATION PRESS (in Hg)	29.71
HEATER BOX TEMP (°F)	
PROBE HEATER SETTING	
PROBE LENGTH (in)	48
NOZZLE AREA (A) (sq ft)	.610
Cp	0.84
DRY GAS FRACTION (Fd)	

TRAVERSE POINT NUMBER	SAMPLING TIME (min) 1715 CDT	STATIC PRESSURE (in H2O)	STACK TEMP (°F)	STACK TEMP (Ts) (°R)	VELOCITY HEAD (Vp)	ORIFICE DIFF. PRESS. (H)	GAS SAMPLE VOLUME (cu ft)	GAS METER TEMP IN 6 (°F)	GAS METER TEMP AVG (Tm) (°R)	GAS METER TEMP OUT 7 (°F)	SAMPLE BOX TEMP 3 (°F)	IMPINGER OUTLET TEMP 4 (°F)
1	3 [illegible]	1.8	1370		.010	0.40	207.297	98		95	252	65
2	6 [illegible]	1.9	1305		.005	0.20		97		96	261	55
3	9 [illegible]	1.8	1354		.005	0.49		97		96	223	53
4	12 [illegible]	1.9	1370		.008	0.32		95		96	271	51
5	15 [illegible]	1.5	1385		.008	0.31		96		98	268	52
6	18 [illegible]	1.5	1410		.010	0.39		95		98	267	54
7	21 [illegible]	1.8	1437		.010	0.38		97		99	267	55
8	24 [illegible]	1.8	1443		.008	0.30		96		98	262	53
9	27 [illegible]	1.6	1430		.010	0.38		94		96	266	52
10	30 [illegible]	1.8	1444		.011	0.42		94		96	264	51
11	33 [illegible]	1.9	1443		.010	0.38		95		96	266	52
12	36 [illegible]	1.9	1448		.010	0.38		95		96	265	52

final 247.992

40.7 cu ft

OEHL FORM MAY 78 18

VISIBLE EMISSION OBSERVATION FORM

No. 1

COMPANY NAME	Griffiss AFB
STREET ADDRESS	
CITY	Rome
STATE	NY
ZIP	
PHONE (KEY CONTACT)	
SOURCE ID NUMBER	Classified Waste Incin.
PROCESS EQUIPMENT	Two stage incinerator
OPERATING MODE	Batch (300 lb)
CONTROL EQUIPMENT	None
OPERATING MODE	—
DESCRIBE EMISSION POINT	Steel 3.5ft O.D. stack, with 2ft cinder ash screen
HEIGHT ABOVE GROUND LEVEL	28 ft
HEIGHT RELATIVE TO OBSERVER	Start 28 ft End same
DISTANCE FROM OBSERVER	Start 100 ft End same
DIRECTION FROM OBSERVER	Start NE End same
DESCRIBE EMISSIONS	Start End
EMISSION COLOR	Start gray/wh to End
IF WATER DROPLET PLUME	Attached ☐ Detached ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	Start 0-5' End 0-5'
DESCRIBE PLUME BACKGROUND	Start clouds End clear sky
BACKGROUND COLOR	Start gray/black End blue
SKY CONDITIONS	Start Partly cloudy End clear
WIND SPEED	Start 4 Kts End
WIND DIRECTION	Start WNW End
AMBIENT TEMP	Start 59 End
WET BULB TEMP	52
RH, percent	77%

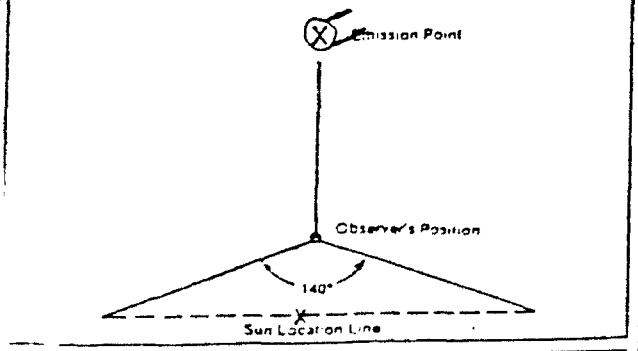
SOURCE LAYOUT SKETCH

Draw North Arrow

Stack with Plume

Sun

Wind



ADDITIONAL INFORMATION

OBSERVATION DATE	START TIME	END TIME
12 Aug 92	1755	

SEC / Min	0	15	30	45	COMMENTS
1	5	5	5	5	1757 Waste loaded and incinerator started
2	5	0	0	0	
3	0	0	0	0	
4	5	0	0	0	
5	5	5	5	5	
6	0	0	0	0	
7	5	5	10	5	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	5	
14	0	5	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	5	
29	5	5	5	5	
30	5	5	5	5	

OBSERVER'S NAME (PRINT)	Robert J O'Brien
OBSERVER'S SIGNATURE	Robert J O'Brien
DATE	12 Aug 92
ORGANIZATION	AL/OERE Brooks AFB TX
CERTIFIED BY	[illegible]
DATE	[illegible]

VISIBLE EMISSION OBSERVATION FORM

No. 1 (continued)

COMPANY NAME: Griffiss AFB

STREET ADDRESS:

CITY | STATE | ZIP

PHONE (KEY CONTACT) | SOURCE ID NUMBER

PROCESS EQUIPMENT | OPERATING MODE

CONTROL EQUIPMENT | OPERATING MODE

DESCRIBE EMISSION POINT

HEIGHT ABOVE GROUND LEVEL | HEIGHT RELATIVE TO OBSERVER (Start / End)

DISTANCE FROM OBSERVER (Start / End) | DIRECTION FROM OBSERVER (Start / End)

DESCRIBE EMISSIONS (Start / End)

EMISSION COLOR (Start / End) | IF WATER DROPLET PLUME (Attached ☐ / Detached ☐)

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED (Start / End)

DESCRIBE PLUME BACKGROUND (Start / End)

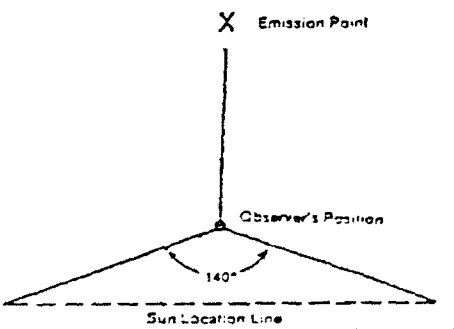
BACKGROUND COLOR (Start / End) | SKY CONDITIONS (Start / End)

WIND SPEED (Start / End) | WIND DIRECTION (Start / End)

AMBIENT TEMP (Start / End) | WET BULB TEMP | RH, percent

Stack with Plume — Sun — Wind

SOURCE LAYOUT SKETCH — Draw North Arrow



ADDITIONAL INFORMATION

OBSERVATION DATE: 12 Aug 92 | START TIME | END TIME: 1815

SEC / MIN	0	15	30	45	COMMENTS
31	5	5	5	0	
32	0	0	0	0	
33	0	0	0	0	
34	0	0	0	0	
35	0	0	0	0	
36	0	0	0	0	
37	0	0	0	0	
38	0	0	0	0	
39	0	0	0	0	
40	0	0	0	0	
41	0	0	0	0	
42	0	0	0	0	
43	0	0	0	0	
44	0	0	0	0	
45	0	0	0	0	
46	0	0	0	0	
47	0	0	0	0	
48	0	0	0	0	
49	0	0	0	0	
50	0	0	0	0	
51	0	0	0	0	
52	0	0	0	0	
53	0	0	0	0	
54	0	0	0	0	
55	0	0	0	0	
56	0	0	0	0	
57	0	0	0	0	
58	0	0	0	0	
59	0	0	0	0	
60	0	0	0	0	

OBSERVER'S NAME (PRINT): Robert J O'Brien

OBSERVER'S SIGNATURE: Robert J O'Brien | DATE: 12 Aug 92

ORGANIZATION: AL/OEBE Brooks AFB TX

CERTIFIED BY: Texas Air Control Board | DATE: 12 Mar 92

AIR POLLUTION PARTICULATE ANALYTICAL DATA

BASE	DATE	RUN NUMBER
Griffiss AFB	12 Aug 92	1

BUILDING NUMBER	SOURCE NUMBER
Classified Waste Incinerator	Advance Combustion Systems, Model CAI-750-

I. PARTICULATES

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT PARTICLES (gm)
FILTER NUMBER		0.0853	0.5105
ACETONE WASHINGS (Probe, Front Half Filter)			0.2113
BACK HALF (If needed)			
	Total Weight of Particulates Collected		0.7218 gm

II. WATER

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT WATER (gm)
IMPINGER 1 H_2SO_4 ~~(H2O)~~	150	100	50
IMPINGER 2 H_2SO_4 ~~(H2O)~~	103	100	3
IMPINGER 3 $NaOH$ ~~(H2O)~~	98	100	-2
IMPINGER 4 (Silica Gel)	207.9	200	7.9
— — —	Total Weight of Water Collected		58.9 gm

III. GASES (Dry)

ITEM	ANALYSIS 1	ANALYSIS 2	ANALYSIS 3	ANALYSIS 4	AVERAGE
VOL % CO_2	6.9	6.8	6.7		6.8
VOL % O_2	12.1	12.0	12.0		12.03
VOL % CO					
VOL % N_2					

Vol % N_2 = (100% - % CO_2 - % O_2 - % CO)

OEHL FORM 20 MAY 78

* Rinse 228 ml

Run 2

Source Test Calculation and Check Program
Output of Run 2

IMP. % HOH	6.8
% HOH	6.8
MWd	29.57
MW WET	28.79
VOL MTR STD	44.455
STK PRES ABS	29.68
VOL HOH GAS	3.22
% MOISTURE	6.75
MOL DRY GAS	0.932
% NITROGEN	81.00
MOL WT DRY	29.57
MOL WT WET	28.79
VELOCITY FPS	9.17
STACK AREA	7.07
STACK ACFM	3,890.
STACK DSCFM	1,043.
% ISOKINETIC	97.67
F GR/DSCF	0.33
F MG/MMM	753.55
F LB/HR	2.94
F KG/HR	1.34

PARTICULATE SAMPLING DATA SHEET

RUN NUMBER: 2

DATE: 15 22 Aug 92

PLANT: Class. Waste Incinerator

BASE: Griffiss AFB

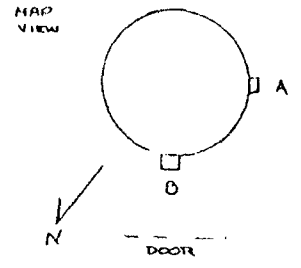
SAMPLE BOX NUMBER: –

METER BOX NUMBER: # 5

Qw/Qm: –

Co: –

SCHEMATIC OF STACK CROSS SECTION



ΔH@ = 0.065
Y = 1.018
ΔH@ = 1.871
Time: 1130 EDT

EQUATIONS

$°R = °F + 460$

$$K = \left[\frac{5130 \cdot Fd \cdot Cp \cdot A}{Co}\right]^2 \cdot \frac{Tm}{Ts} \cdot Vp$$

Pre-leak check:
Post leak Check:

AMBIENT TEMP: °F

STATION PRESS: 29.480 in Hg

HEATER BOX TEMP: 250 +/- 25 °F

PROBE HEATER SETTING:

PROBE LENGTH: 48 in

NOZZLE AREA (A): 0.7677 sq ft

Cp: .84

DRY GAS FRACTION (Fd): –

TRAVERSE POINT NUMBER	SAMPLING TIME (min)	STATIC PRESSURE (in H20)	STACK TEMP (°F)	STACK TEMP (Ts) (°R)	VELOCITY HEAD (Vp)	ORIFICE DIFF. PRESS. (H)	GAS SAMPLE VOLUME (cu ft)	GAS METER TEMP IN (°F)	GAS METER TEMP AVG (Tm) (°R)	GAS METER TEMP OUT (°F)	SAMPLE BOX TEMP (°F)	IMPINGER OUTLET TEMP (°F)
A 1	4	1.7	1263		.004	0.41	267.344	86		84	252	68
2	8	1.7	1356		.004	0.39		86		85	254	56
3	12	1.9	1410		.005	0.48		86		85	254	53
4	16	1.9	1430		.006	0.56		85		84	254	51
5	20	2.0	1442		.007	0.65		85		84	253	49
6	24	2.0	1437		.007	0.65		85		83	254	49
7	28	2.1	1444		.010	0.93		84		83	255	50
8	32	2.5	1439		.016	1.49		84		82	255	50
9	36	2.1	1425		.019	1.79		85		82	260	50
10	40	2.5	1447		.020	1.86		86		83	262	50
11	44	3.6	1443		.019	1.77		87		83	258	51
12	48	3.8	1432		.019	1.79		88		83	257	52
							293.147					
	Avg Nozz Temp $\bar{T}_n$		82				= 15.101 cu ft					
	Avg Stack Temp $\bar{T}_s$		1361									
	Avg $\sqrt{\Delta H}$		$\overline{\sqrt{\Delta H}}$		0.29							
	Avg $(\Delta H T_s)^{1/2}$		$(\overline{\Delta H T_s})^{1/2}$		3.7337							

OEHL FORM 18

PARTICULATE SAMPLING DATA SHEET

RUN NUMBER: 2	SCHEMATIC OF STACK CROSS SECTION	EQUATIONS	AMBIENT TEMP: 57 °F
DATE: 22 Aug 92		$°R = °F + 460$	STATION PRESS: 29.680 in Hg
PLANT: Class. Waste Incinerator		$H = \left[\frac{5130 \cdot Fd \cdot Cp \cdot A}{Co}\right]^2 \cdot \frac{Tm}{Ts} \cdot Vp$	HEATER BOX TEMP: 250 +/- 25 °F
BASE: Griffiss AFB			PROBE HEATER SETTING:
SAMPLE BOX NUMBER: -			PROBE LENGTH: 48 in
METER BOX NUMBER: # 5	1104 -0.065		NOZZLE AREA (A): 0.7677 sq ft
Qw/Qm: -	Y: 1.018	Pre-leak check: Pitot good / Probe 15-	Cp: .84
Co: -	ΔH@: 1.871	Post leak Check:	DRY GAS FRACTION (Fd): -
	Time: EDT		

TRAVERSE POINT NUMBER	SAMPLING TIME (min)	STATIC PRESSURE (in H2O)	STACK TEMP (°F)	STACK TEMP (Ts) (°R)	VELOCITY HEAD (Vp)	ORIFICE DIFF. PRESS. (H)	GAS SAMPLE VOLUME (cu ft)	GAS METER TEMP IN (°F)	GAS METER TEMP AVG (Tm) (°R)	GAS METER TEMP OUT (°F)	SAMPLE BOX TEMP (°F)	IMPINGER OUTLET TEMP (°F)
1	4	1.8	1080		.005	0.56	248.046	73		72	[illegible]	54
2	8	1.8	1100		.005	0.56		75		73	[illegible]	[illegible]
3	12	1.9	1241		.005	0.51		78		74	[illegible]	[illegible]
4	16	1.9	1268		[illegible]	0.51		80		75	257	54
5	20	1.9	1313		.005	0.50		82		77	259	55
6	24	1.9	1337		.005	0.49		83		78	258	55
7	28	1.9	1369		.006	0.58		84		79	256	55
8	32	2.0	1387		.006	0.57		85		80	258	55
9	36	2.0	1393		.005	0.46		86		80	[illegible]	55
10	40	2.0	1400		.006	0.57		86		81	255	55
11	44	1.0	1400		.005	0.48		87		82	258	55
12	48	1.9	1402		.005	0.48		88		84	250	55
							267.344					

OEHL FORM 18

VISIBLE EMISSION OBSERVATION FORM

No. 1

COMPANY NAME: Griffiss AFB

STREET ADDRESS:

CITY: Rome | STATE: NY | ZIP:

PHONE (KEY CONTACT): | SOURCE ID NUMBER: [illegible] waste [illegible]

PROCESS EQUIPMENT: Two stage incinerator | OPERATING MODE: Batch (3 ...)

CONTROL EQUIPMENT: None | OPERATING MODE: —

DESCRIBE EMISSION POINT: steel 3.5 ft OD stack, with 2 ft [illegible] screen

HEIGHT ABOVE GROUND LEVEL: 28 ft | HEIGHT RELATIVE TO OBSERVER: Start 28 ft End same

DISTANCE FROM OBSERVER: Start 120 ft End same | DIRECTION FROM OBSERVER: Start SSW End same

DESCRIBE EMISSIONS: Start N/A End

EMISSION COLOR: Start End | IF WATER DROPLET PLUME: Attached ☐ Detached ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: Start End

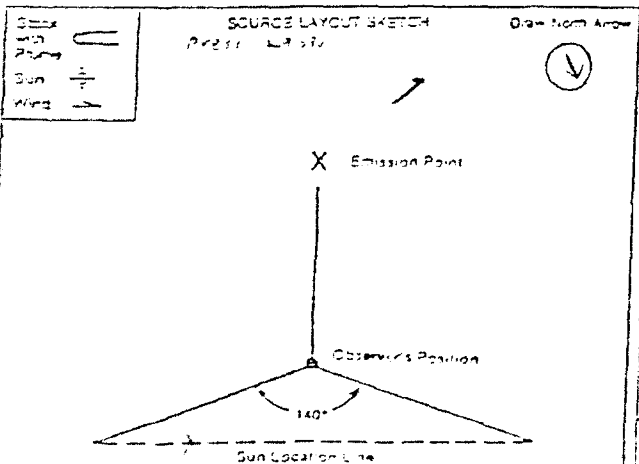
DESCRIBE PLUME BACKGROUND: Start grey clouds End same

BACKGROUND COLOR: Start grey End same | SKY CONDITIONS: Start overcast End same

WIND SPEED: Start 3 kts End | WIND DIRECTION: Start SSE End same

AMBIENT TEMP: Start 57 End 65 | WET BULB TEMP: 5[illegible] | RH, percent: 87

SOURCE LAYOUT SKETCH — Draw North Arrow



ADDITIONAL INFORMATION:

OBSERVATION DATE: 13 Aug 92 | START TIME: 1027 | END TIME: 1057

MIN \ SEC	0	15	30	45	COMMENTS
1	0	0	0	0	[illegible] Engineering test and [illegible]
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

OBSERVER'S NAME (PRINT): Robert J. O'Brien

OBSERVER'S SIGNATURE: Robert J. O'Brien | DATE: 13 Aug 92

ORGANIZATION: AL/OEBE Brooks AFB TX

CERTIFIED BY: Texas Air Control Board | DATE: [illegible]

AIR POLLUTION PARTICULATE ANALYTICAL DATA

BASE	DATE	RUN NUMBER
Griffiss AFB	12 Aug 92	2

BUILDING NUMBER	SOURCE NUMBER
Classified Waste Incinerator	Advance Combustion Systems, Model CAI-750-H

I. PARTICULATES

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT PARTICLES (gm)
FILTER NUMBER		2856	0.7777
ACETONE WASHINGS (Probe, Front Half Filter)			0.1709
BACK HALF (If needed)			
	Total Weight of Particulates Collected		0.9486 gm

II. WATER

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT WATER (gm)
IMPINGER 1 (H2O)	152	100	52
IMPINGER 2 (H2O)	108	100	8
IMPINGER 3 (Dry)	100	100	0
IMPINGER 4 (Silica Gel)	208.4	200	8 4
	Total Weight of Water Collected		684 gm

III. GASES (Dry)

ITEM	ANALYSIS 1	ANALYSIS 2	ANALYSIS 3	ANALYSIS 4	AVERAGE
VOL % CO_2	6.8	6.8	6.7		6.77
VOL % O_2	12.2	12.2	12.3		12.23
VOL % CO					
VOL % N_2					

Vol % N_2 = (100% - % CO_2 - % O_2 - % CO)

QEHL FORM MAY 78 20

* Rinse 224 ml

Run 3

Source Test Calculation and Check Program
Output of Run 3

IMP. % HOH	8.1
% HOH	8.1
MWd	29.40
MW WET	28.48
VOL MTR STD	41.556
STK PRES ABS	29.63
VOL HOH GAS	3.68
% MOISTURE	8.13
MOL DRY GAS	0.919
% NITROGEN	80.34
MOL WT DRY	29.40
MOL WT WET	28.48
VELOCITY FPS	8.55
STACK AREA	7.07
STACK ACFM	3,627.
STACK DSCFM	957.
% ISOKINETIC	99.50
F GR/DSCF	0.23
F MG/MMM	535.62
F LB/HR	1.92
F KG/HR	0.87

PARTICULATE SAMPLING DATA SHEET

RUN NUMBER: 3	SCHEMATIC OF STACK CROSS SECTION	EQUATIONS	AMBIENT TEMP: 59 °F
DATE: 22 Aug 92		$°R = °F + 460$	STATION PRESS: [illegible] in Hg
PLANT: Class. Waste Incinerator		$H = \left[\frac{5130 \cdot Fd \cdot Cp \cdot A}{Co}\right]^2 \cdot \frac{Tm}{Ts} \cdot Vp$	HEATER BOX TEMP: 250 +/- 25 °F
BASE: Griffiss AFB			PROBE HEATER SETTING:
SAMPLE BOX NUMBER: –			PROBE LENGTH: 48 in
METER BOX NUMBER: 5 Y-1.018			NOZZLE AREA (A): [illegible] sq ft
Qw/Qm: –	HOH - 0.065 ΔH@ = 1.871 Time: 16.57 EDT	Pre-leak check: [illegible] Post leak Check: [illegible] 15" Hg	Cp: .84
Co: –			DRY GAS FRACTION (Fd): –

TRAVERSE POINT NUMBER	SAMPLING TIME (min)	STATIC PRESSURE (in H2O)	STACK TEMP (°F)	STACK TEMP (Ts) (°R)	VELOCITY HEAD (Vp)	ORIFICE DIFF. PRESS. (H)	GAS SAMPLE VOLUME (cu ft)	GAS METER TEMP IN (°F)	GAS METER TEMP AVG (Tm) (°R)	GAS METER TEMP OUT (°F)	SAMPLE BOX TEMP (°F)	IMPINGER OUTLET TEMP (°F)
A1	4	2.0	1235	/	0.005	[illegible]	293.422	[illegible]	/	[illegible]	[illegible]	
2	8	2.0	1351		[illegible]	0.32		66		64	[illegible]	
3	12	2.0	1342		[illegible]	0.31		66		[illegible]		
4	16	2.0	1357		.005	0.50		67		65	[illegible]	
5	20	2.0	1368		.005	0.50		67		[illegible]	[illegible]	
6	24	2.0	1386		.005	0.41		68		[illegible]	[illegible]	
7	28	2.0	1305		.007	0.69		[illegible]		66	[illegible]	
8	32	2.0	1411		.007	0.68		70		66	[illegible]	
9	36	2.1	1419		.008	0.78		70		67	[illegible]	
10	40	2.2	1428		.009	0.78		71		67	[illegible]	
11	44	2.2	1420		.007	0.68		72		67	[illegible]	
12	48	2.2	1413		[illegible]	[illegible]		[illegible]		[illegible]	[illegible]	

OEHL FORM 18

PARTICULATE SAMPLING DATA SHEET

RUN NUMBER	SCHEMATIC OF STACK CROSS SECTION	EQUATIONS	AMBIENT TEMP
3		$^{o}R = ^{o}F + 460$	°F
DATE: 22 Aug 92		$H = \left[\frac{5130 \cdot Fd \cdot Cp \cdot A}{Co}\right]^2 \cdot \frac{Tm}{Ts} \cdot Vp$	STATION PRESS: in Hg
PLANT: Clana. Waste Incinerator			HEATER BOX TEMP: 250 +/- 25 °F
BASE: Griffiss AFB			PROBE HEATER SETTING
SAMPLE BOX NUMBER: -			PROBE LENGTH: 48 in
METER BOX NUMBER: [illegible]	[illegible]		NOZZLE AREA (A): sq ft
Qw/Qm: -	[illegible]	Pre-leak check:	Cp: .84
Co: -	Time: [illegible] EDT	Post leak Check:	DRY GAS FRACTION (Fd): -

TRAVERSE POINT NUMBER	SAMPLING TIME (min)	STATIC PRESSURE (in H2O)	STACK TEMP (°F)	STACK TEMP (Ts) (°R)	VELOCITY HEAD (Vp)	ORIFICE DIFF. PRESS. (H)	GAS SAMPLE VOLUME (cu ft)	GAS METER TEMP IN (°F)	GAS METER TEMP AVG (Tm) (°R)	GAS METER TEMP OUT (°F)	SAMPLE BOX TEMP (°F)	IMPINGER OUTLET TEMP (°F)
1	[illegible]	1.9	[illegible]		0.004	[illegible]						
2	5	2.0	190		[illegible]	[illegible]						
3	[illegible]	2.[illegible]	1222		[illegible]	0.[illegible]		[illegible]				
4	[illegible]	2.0	1267		0.[illegible]	0.[illegible]		[illegible]				
5	[illegible]	2.1	113		0.006	[illegible]		[illegible]				
6	[illegible]	2.2	1430		0.010	[illegible]		71				
7	25	[illegible]	1410		[illegible]	0.[illegible]		72		[illegible]		
8	[illegible]	2.6	1432		[illegible]	0.[illegible]		72		[illegible]		
9	[illegible]	2.7	1395		.005	[illegible]		74		[illegible]		
10	[illegible]	2.6	1427		[illegible]	[illegible]		74		62		
11	[illegible]	2.5	1333		0.007	[illegible]		74		[illegible]		
12	[illegible]	2.6	1405		.007	0.[illegible]		74		62		
					[illegible]	[illegible]		74		67		
							321.651					
	[illegible]						[illegible]					
	[illegible] 1300											
	[illegible]											
	[illegible]	[illegible]										

OEHL FORM 18 [illegible]

[illegible] 8.1 [illegible]

VISIBLE EMISSION OBSERVATION FORM

No. 3

COMPANY NAME: Griffiss AFB	OBSERVATION DATE: 13 Aug 92	START TIME: 1657
STREET ADDRESS:		END TIME: 1727
CITY: Rome	STATE: NY	ZIP:
PHONE (KEY CONTACT):	SOURCE ID NUMBER:	

PROCESS EQUIPMENT: Two stage incinerator	OPERATING MODE: Batch (1 of 6)
CONTROL EQUIPMENT: None	OPERATING MODE:

DESCRIBE EMISSION POINT: steel 3.5 ft O.D. stack, with 2 ft cinder ash

screen

HEIGHT ABOVE GROUND LEVEL: 42 ft	HEIGHT RELATIVE TO OBSERVER: Start 42 ft End same
DISTANCE FROM OBSERVER: Start 100 ft End same	DIRECTION FROM OBSERVER: Start NE End same

DESCRIBE EMISSIONS: Start N/A End

EMISSION COLOR: Start End	IF WATER DROPLET PLUME: Attached ☐ Detached ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: Start End

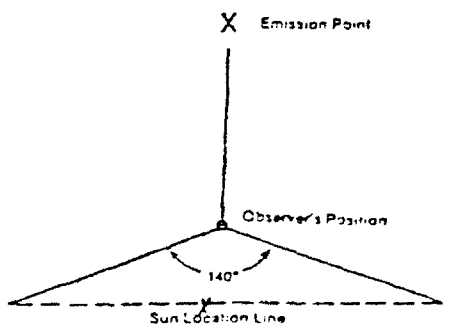
DESCRIBE PLUME BACKGROUND: Start clouds End same

BACKGROUND COLOR: Start gray/brick End same	SKY CONDITIONS: Start overcast End same
WIND SPEED: Start 4 kts End same	WIND DIRECTION: Start ESE End same
AMBIENT TEMP: Start 59 End same	WET BULB TEMP: 51
RH, percent: 77	

Stack with Plume ⊂ Sun ☀ Wind →

SOURCE LAYOUT SKETCH

Draw North Arrow ↑



SEC / MIN	0	15	30	45	COMMENTS
1	0	0	0	0	1630 waste loading start incinerator burning
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

OBSERVER'S NAME (PRINT): Robert J. O'Brien	
OBSERVER'S SIGNATURE: Robert J. O'Brien	DATE: 13 Aug 92
ORGANIZATION: AL/OEBE Brooks AFB TX	
CERTIFIED BY: Air Control Tech	DATE: 13 Aug 92

ADDITIONAL INFORMATION:

gr/dscf corrected to 12% CO_2 = 0.3825 g/dscf @ 12% CO

AIR POLLUTION PARTICULATE ANALYTICAL DATA

BASE	DATE	RUN NUMBER
Griffiss AFB	12 Aug 92	3

BUILDING NUMBER	SOURCE NUMBER
Classified Waste Incinerator	Advance Combustion Systems, Model CAI-750-

I. PARTICULATES

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT PARTICLES (gm)
FILTER NUMBER		.0859	0.5283
ACETONE WASHINGS (Probe, Front Half Filter)			0.1020
BACK HALF (If needed)			
	Total Weight of Particulates Collected		0.6303 gm

II. WATER

ITEM	FINAL WEIGHT (gm)	INITIAL WEIGHT (gm)	WEIGHT WATER (gm)
IMPINGER 1 ~~H_2SO_4~~ (H2O)	154	100	54
IMPINGER 2 ~~H_2SO_4~~ (H2O)	112	100	12
IMPINGER 3 ~~$NaOH$~~ (Dry)	104	100	4
IMPINGER 4 (Silica Gel)	206.1	200	6.1
	Total Weight of Water Collected		78.1 gm

III. GASES (Dry)

ITEM	ANALYSIS 1	ANALYSIS 2	ANALYSIS 3	ANALYSIS 4	AVERAGE
VOL % CO_2	5.2	5.1	5.1		5.13
VOL % O_2	14.6	14.5	14.5		14.53
VOL % CO					
VOL % N_2					

Vol % N_2 = (100% - % CO_2 - % O_2 - % CO)

OEHL FORM MAY '79 20

* Rinse 77ml

APPENDIX J

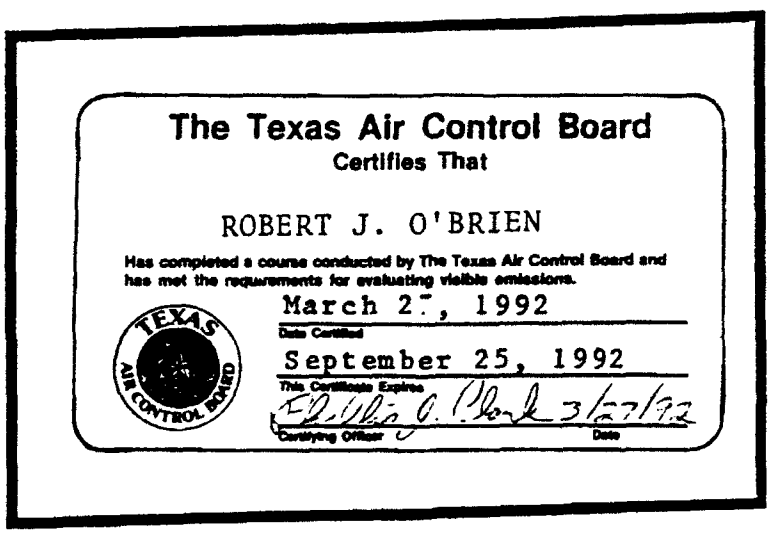
1988 Stack Test Conditions

Stack Test Conditions - 1988

Run #	Stack Velocity fps	Stack Gas Temperature (^{o}F)	Stack Gas Oxygen Content (%)	Stack Gas Carbon Dioxide Content (%)
1	11.36	1421	8.7	10.6
2	11.72	1436	10.3	9.0
3	10.71	1443	9.5	9.4
Avg	11.26	1433	9.5	9.7

APPENDIX K

EPA Method 9 Certification



The Texas Air Control Board
Certifies That

ROBERT J. O'BRIEN

Has completed a course conducted by The Texas Air Control Board and has met the requirements for evaluating visible emissions.

March 27, 1992
Date Certified

September 25, 1992
This Certificate Expires

Certifying Officer

3/27/92
Date

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